

## REMARKS

### I. Formal Changes in the Claims

The claim wording has been changed to provide a more logically consistent claim wording that complies better with the formal requirements.

The word "claim" within the various dependent claims was not consistently capitalized throughout the claims. Also the preamble of claim 12 contained an extra word, leading to a grammatical error.

The general format of all of claims 1 to 20 was amended to provide a consistent standard form.

Also the terms "at least one base layer" and "at least one covering layer" have been changed to "a base layer" and "a covering layer". Page 9 of the specification of the above-identified U.S. Patent Application clearly states that the base layer and the covering layer can each comprise a plurality of individual layers. Thus it is unnecessary to use the "at least one" wording. Furthermore it leads to confusion regarding the dependent claims, for example claim 2, which defines the thickness of the covering layer.

Also each abbreviation has been replaced by the term it represents, which was appears in the applicants' specification.

In addition, two new independent substrate claims 21 and 22 have been added, which have additional limitations that are not present in either claim 1 or

claim 20. The features and limitations of claim 22 for the base layer are found on page 7, lines 9 to 13, and for the covering layer on page 6, lines 34 to 37. No new matter has been added.

## II. Anticipation Rejections

### A. Krauth

Claims 1 to 20 were rejected as anticipated under 35 U.S.C. 102 (e) by Krauth.

Krauth claims a method of fabricating a reticle or mask for EUV photolithography. The reticle comprises a low thermal expansion material (substrate), a planarizing layer adhering to the substrate and a reflecting layer adhering to the planarizing layer (abstract, claim 1). The low thermal expansion material (substrate) preferably has a thermal expansion coefficient of less than 0.1 ppm/°C, according to claim 5 of Krauth. Column 2, lines 23 to 26, disclose embodiments in which the substrate material is ZERODUR®, as claimed in claim 5 of the above-identified U.S. Patent Application.

The planarizing layer of Krauth can be made of a dielectric or polymeric material, which can include organic resins, amorphous silicon, titanium oxide, chromium oxide and spin-on glasses, such as silicates or siloxanes, as disclosed in column 3, lines 24 to 27; column 4, line 53, to column 5, line 7 of Krauth. However none of these materials have as low a coefficient of thermal expansion

as claimed in applicants' claim 1, namely at most 1 ppm/°C, or all other independent claims including the process claims. A computer search of the Internet or a Handbook can verify the foregoing assertion. For example, a search of the Internet using the Google search engine showed that the CTE of TiO<sub>2</sub> is 8.0x10<sup>-6</sup>/°C from 20°C to 400°C.

Thus Krauth does not teach the limitation that the covering layer has a coefficient of thermal expansion of at most 1 ppm/°C, as claimed in independent article claims 1, 13, 20 and 21 and in process claims 9 and 19. Also Krauth does not teach the limitation that the covering layer has a coefficient of thermal expansion of 0.5 ppm/°C, as claimed in independent article claim 22.

With respect to claim 4, Krauth does not teach the limitation that the covering layer is made of silicon dioxide. This means that the covering layer includes the substance, silicon dioxide, not merely that the elements silicon and oxygen are present in some combination. Silicon, as pointed out in Krauth, has a coefficient of thermal expansion of 2.5 ppm/°C, in column 2, line 23. There is no disclosure in Krauth that the planarizing layer is silicon dioxide, only that it can be a spin-on glass comprising a silicate or siloxane. A silicate or siloxane is not the same as silicon dioxide, and has different properties. Other than that the reference, Krauth, does not disclose a detailed composition for the "spin-on" glasses.

It is well established that each and every limitation of a claimed invention must be disclosed in a single prior art reference in order to be able to reject the

claimed invention under 35 U.S.C. 102 (b) based on the disclosures in the single prior art reference. See M.P.E.P. 2131 and also the opinion in *In re Bond*, 15 U.S.P.Q. 2<sup>nd</sup> 1566 (Fed. Cir. 1990).

Summarizing: Krauth does not disclose the limitation that the covering layer has a coefficient of thermal expansion of at most 1 ppm/°C; Krauth does not disclose the limitation that the covering layer is silicon dioxide.

The use of silicon dioxide or titanium-doped silicon dioxide as the covering layer is particularly advantageous because the coefficient of thermal expansion can be matched to that of the substrate material. As a result, the substrate can undergo repeated heating and cooling cycles without developing cracks, while at the same time the material of the covering layer can provide the required optimum surface roughness (page 9, line 35, to page 10, line 19 of applicants' specification).

For the foregoing reasons withdrawal of the rejection of amended claims 1 to 20 under 35 U.S.C. 102 (e) as anticipated by Krauth is respectfully requested.

Furthermore it is respectfully submitted that new claims 21 and 22 should not be rejected as anticipated under 35 U.S.C. 102 (e) as anticipated by Krauth.

B. Tong, et al

Claims 1 to 20 were rejected as anticipated under 35 U.S.C. 102 (e) by Tong, et al.

US Patent 6,387,572 discloses a substrate for reflective EUV lithography that includes a first layer (substrate) with a low CTE, which can be titanium silicate glass or ceramic glass (claim 13 of US '572), and a second layer on the first layer of a high surface quality (abstract, claim 1 of US '572). Tong, et al, also mentions that the substrate can be made of ZERODUR® or ULE®, with a CTE of 0.1 ppm/°C.

According to claim 1 of US '572 the second layer (covering layer) consists of silicon, sapphire, germanium, beryllium or silicon carbide. Table 1 in column 2 lists the silicon CTE as around 3 ppm/°C. Silicon carbide has a CTE around 4-5 ppm/°C (see for example US Patent 6,403,155). These well known materials do not have a CTE as low as is claimed in amended article claims 1, 13, 20, 21 and 22 and in process claims 9 and 19. The silicon dioxide or titanium-doped silicon dioxide layer of applicants has a CTE of less than or equal to 1 ppm/°C, preferably less than or equal to 0.5 ppm/°C.

It is well established that each and every limitation of a claimed invention must be disclosed in a single prior art reference in order to be able to reject the claimed invention under 35 U.S.C. 102 (b) based on the disclosures in the single prior art reference. See M.P.E.P. 2131 and also the opinion in *In re Bond*, 15 U.S.P.Q. 2nd 1566 (Fed. Cir. 1990).

Summarizing: Krauth does not disclose the limitation that the covering layer has a coefficient of thermal expansion of at most 1 ppm/ $^{\circ}$ C; Krauth does not disclose the limitation that the covering layer is silicon dioxide.

The use of silicon dioxide or titanium-doped silicon dioxide as the covering layer is particularly advantageous because the coefficient of thermal expansion can be matched to that of the substrate material. As a result, the substrate can undergo repeated heating and cooling cycles without developing cracks, while at the same time the material of the covering layer can provide the required optimum surface roughness (page 9, line 35, to page 10, line 19 of applicants' specification).

For the foregoing reasons withdrawal of the rejection of amended claims 1 to 20 under 35 U.S.C. 102 (e) as anticipated by Tong, et al, is respectfully requested.

Furthermore it is respectfully submitted that claims 21 and 22 should not be rejected as anticipated under 35 U.S.C. 102 (e) as anticipated by Tong, et al.

### III. SPECIFICATION

Some minor errors including spelling errors, typographical errors and incomplete sentences were corrected by the above changes.

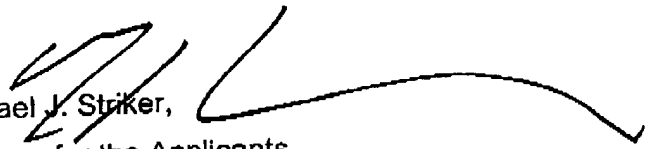
#### IV. INFORMATION DISCLOSURE STATEMENT

The Examiner has not initialed the Information Disclosure Statement received in the USPTO on November 12, 2003 to indicate that the prior art reference entitled "Low Expansion Glass Ceramics", Schott Series on Glass and Glass Ceramics has been considered during examination. Since this prior art reference is in English and has been filed together with this Information Disclosure Statement, consideration of its subject matter is respectfully requested. Furthermore the return of another copy of the Information Disclosure Statement received November 12, 2003, which is initialed to indicate that the aforesaid reference has been considered, is requested.

Should the Examiner require or consider it advisable that the specification, claims and/or drawing be further amended or corrected in formal respects to put this case in condition for final allowance, then it is requested that such amendments or corrections be carried out by Examiner's Amendment and the case passed to issue. Alternatively, should the Examiner feel that a personal discussion might be helpful in advancing the case to allowance, he or she is invited to telephone the undersigned at 1-631-549 4700.

In view of the foregoing, favorable allowance is respectfully solicited.

Respectfully submitted,

  
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